



Australian Bureau of Statistics

1301.0 - Year Book Australia, 1991

ARCHIVED ISSUE Released at 11:30 AM (CANBERRA TIME) 01/01/1991

PRESERVATION OF ROCK IMAGERY

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INTRODUCTION

Aboriginal Australia has a long history of artistic endeavour, pictures on rock, found throughout the continent, date from many millennia ago and continue into the present to be an integral and significant part of Aboriginal culture. In recent years, increasing numbers of tourists have sought to visit the extensive areas of rock imagery made accessible in Kakadu National Park and elsewhere; agencies with statutory responsibility for site management and Aboriginal communities both are expressing fear for the integrity of these sites. There is a need for conservation and management of such sites, both to preserve the fragile fabric of the imagery and its substrate from environment forces and to protect the places from visitors.

Australian Aboriginal Rock Pictures

Rock pictures are widespread throughout Australia, being found from the far north - with notable concentrations in the Kimberley, Victoria River, Arnhem Land and Cape York Peninsula - through the Pilbara, Flinders Ranges, and Sydney Sandstone, to the Grampians in western Victoria and the ice-age caves of south-western Tasmania. Some consider the rock imagery of parts of Australia more than equal to that of Europe and elsewhere in terms of its extent, concentration and artistic significance. It appears (dating is ever subject to revision) as old if not older than that of Europe. Engraved walls excavated from beneath archaeological deposits in the Cape York area have been dated to more than 13,000 years ago (Rosenreid et al. 1981). Pigments used in pictographs made on sandstone shelters in the far north of Australia have yielded a date of about twenty thousand years ago (Loy et al. 1990). **'Rock varnish' in petroglyphs in South Australia has been dated to greater than thirty thousand years ago (Nobbs and Dorn 1988). Red and yellow ochres, perhaps used in rock painting, have been recovered from contexts dated to 60,000 ago (Roberts et al. 1990).**

It is useful to distinguish between rock engravings (petroglyphs), and paintings and drawings (pictographs). Petroglyphs are made by removing rock from the substrata - by pecking, hammering or abrading - leaving a negative impression (Figure 1). Pictographs are made by adding pigments to a rock surface; drawings are made onto walls using dry pigments, and paintings are made using wet pigments (Figures 2-8). Both are made by using brushes, fingers and palms or stencilling techniques.

The motifs represented in Australian rock pictures are very varied - appropriately enough given the tens of thousands of sites and range of environments in which they exist (McCarthy 1967). In what has been described as some of the stylistically earliest engravings found at Koonalda Cave in South Australia, simple, probably non-representational motifs predominate. Single or multiple

parallel meandering lines appear to have been made by running fingers across the soft limestone and single shallow scratches made by incising with a sharp stone (Wright 1971). Elsewhere, petroglyphs form geometric figures; distinctive representations of bird and animal tracks; various fauna; items of cultural material (including tools, weapons and ritual objects); mythical figures such as the Rainbow-Serpent and even human faces. These might be singular motifs or groups forming scenes of hunting parties or dancers.

Pictographs embrace a similar range of subject matter but probably tend more to be representational than geometric motifs, with the addition in many areas of hand stencils and impressions, and a considerable array of anthropomorphic figures. Extensive and elaborate friezes of paintings with a variety of subject matter and much superimposition of motifs have been recorded throughout Australia. Pictographs also include items reflecting contact with other communities - Macassans in the north, large sailing ships and pearlers and luggers in various coastal areas, men on horseback and with cattle, dogs and guns in areas further inland. Several distinctive styles of rock painting have been defined, especially in the north, with the Bradshaw and Wandjina (in the Kimberleys), Mimi (stick figure) and X-ray (in Arnhem Land) being well-known.

It is not surprising that such a wealth of artistic endeavour has received considerable attention from researchers and tourists. Among the former, McCarthy (1967) has provided a useful overview. Many systematic and regional studies have been made and several of the more recent and accessible are included in the reading list. Examples of tourist interest can be seen in almost any travel brochure dealing with Australia's north. A recent survey of overseas visitors to Australia by the Australia Council, through the Bureau of Tourism Research, reported that: half of the overseas visitors were interested in seeing and learning about Aboriginal art, thirty per cent purchase an Aboriginal art or related item, and one-fifth went to a museum or gallery especially to see Aboriginal art. While questions specifically concerning rock pictures were not included, these data tend to support observations of increasing interest in visitation to Australian sites. Records made at Kakadu National Park show that, in 1987, at least 150,000 people (including nearly 86 per cent of all private visitors to the Park) visited one or more of the painted galleries at Ubirr, Nourlangie and elsewhere.

The need for protection

Concerted tourism uncontrolled tends to destroy the focus of its interest. That expanding type, 'heritage tourism', one interest of which is rock pictures, has the potential to damage irretrievably many sites, and there is increasing recognition of the need to develop and implement measures to protect the resource base. Heritage tourism has other negative facets.

Firstly, some Aboriginal communities do not want large numbers, or any, visitors to places which are culturally important to them: others want a share of the heritage tourism cake, and the problem for the communities becomes one of balancing various facets of its interests, including conserving the sites themselves.

Secondly, there is a tendency to treat petroglyphs and pictographs as 'gallery art' comparable with the Western notion of 'fine art'. There is Aboriginal, and ethnographic, objection to this veneration of 'rock art' as 'art as object', valued for its antiquity and authenticity, a perception which tends to remove the imagery from its cultural context. This is particularly objectionable when that context currently is of significance to the originating community or its cultural descendants. A preferable view is that of 'art as process' in which the context within which the imagery is produced and used is more significant than the object itself, and one of the problems of conservation of rock imagery is maintaining in modern circumstances this perception of its context. Related to this is the controversy over 'retouch' or 'repainting' of imagery, a practice which is well-attested as commonplace in traditional Aboriginal cultures but opposed by some who stress the static, 'heritage' value of 'rock art'.

Thirdly, and most obviously, there is the continuing threat to the physical fabric of petroglyphs and pictographs. This derives from a wide range of sources, from surface and sub-surface water, frost, mineral salts, soil cover and vegetation, airborne dust, microflora, native and feral animals, vandals and other visitors (Figures 1-4). At some sites, the physical deterioration of the imagery since it was originally executed or last repainted, is plainly recorded in reports and photographs. The deterioration of images might be a direct function of the materials used. Engravings are easily made into the soft surfaces of the sandstone of the Sydney - Hawkesbury region and of southern Queensland; equally readily, these rocks deteriorate when exposed to weathering forces or are walked upon or brushed against; the vulnerability of such surfaces also encourages graffitiists. The materials used to create the vibrant painted images found throughout Australia - oxides of iron and manganese, charcoal and clay - were mixed with water, and perhaps, fats, blood and other materials into a paste or solution to be blown from the mouth, applied by finger or brush of twig or feather, are not necessarily the mixtures most resilient (although some might combine chemically with the surface to which they have been applied) to exposure and changeable weather conditions, or brushing against by sweeping branches, cattle flanks or curious fingers. After prolonged weathering many pigments remain only as chemical 'stains'.

The need to develop conservation measures for petroglyphs and pictographs became increasingly apparent in Australia during the last few decades. As part of a federally-funded national program beginning in 1973 and administered by the Australian Institute of Aboriginal Studies (AIAS), a conservator was employed at the Western Australian Museum to develop and implement conservation strategies, this work by John Clarke also provided the basis of conservation projects elsewhere in Australia and prompted increasing awareness of the extent of the threat to rock imagery. During the mid and late 1970s meetings in Hobart, Perth and Sydney identified various problems and discussed possible solutions. Specialist studies of problems of the conservation and management of painting sites in Kakadu National Park were published (Gillespie 1981) emphasising the magnitude of the conservation problem throughout Australia. Another meeting, held at Kakadu National Park in 1983 involving many Aboriginal people, considered problems of visitor access and control at Aboriginal sites (Sullivan 1984). An initiative of the four Australian Academies prompted two studies: Professor Fay Gale and her students investigated the behaviour of tourists at painted sites in Kakadu National Park (Gale and Jacobs 1987); Dr Andree Rosenfeld synthesised existing knowledge of the causes of deterioration and means of preservation of petroglyphs and pictographs (Rosenfeld 1985). These reports served as points of departure in two of the major areas being developed, that of physical conservation and that of visitor management.

THE AUSTRALIAN INSTITUTE OF ABORIGINAL STUDIES' ROCK ART PROGRAM

A reviewer had recommended that AIAS undertake a study of rock art conservation and this proposal was supported by the then Minister for Aboriginal Affairs, the Hon. Clyde Holding. The Minister asked AIAS to administer a program for the 'protection of Aboriginal rock art' (Ward and Sullivan 1989). Funds for this purpose were provided from the Commonwealth Government's 1987 Budget and in subsequent years. The level of interest in, and need for, the program was reflected in the number of applications and level of funding sought. In the initial year, thirty applications for funding were received totalling nearly half a million dollars, despite the fact that only \$150,000 was available; comparable levels were sought in subsequent years (Ward 1989).

The Institute took a broad view of the term 'protection' and allocated funding to applications in four categories: survey and recording, including inventory and evaluation; physical protection measures and visitor control studies; research into physical conservation techniques; and public awareness/training programs. Examples of projects are considered below.

A conservation manual for use by site managers

The Institute has supported formal training of site conservators at the then Canberra College of Advanced Education, and several graduates of the successful CCAE/Getty Conservation Institute course are now working in various fields within Australia. At the same time, there clearly was a need for a manual which described various simple but useful techniques that site managers could apply to endangered imagery or sites as a whole. With funding from the Rock Art Protection Program (RAPP), David Lambert, a geologically-trained conservator working with the New South Wales National Parks and Wildlife Service at Gosford, took six months leave to prepare and write the manual. He visited sites throughout Australia to extend his experience of conservation problems peculiar to different regions and to discuss the particular concerns of site managers in each State and Territory. The understanding that he gained of problems faced by conservators and his direct experience in working with a wide variety of painting and engraving sites is evident in his report to the Institute which, avoiding duplication of Rosenfeld's discussions, concentrates on methods of treating particular problems in the field. He deals with, in turn: methods of minimising frost and water damage; of treating salt decay, including the use of a 'sacrificial render'; the safe removal of soil cover and vegetation affecting surfaces; the removal and control of microflora (algae, lichen, fungi and bacteria); and the treatment of damage by animals, insects, birds, macropods, domestic stock and feral animals, including the removal of wasp's and bird's mudnests and the repair of any damage. There is an extensive section on the management of sites to reduce the impact of visitors with reference to case studies on the use of walkways at Mootwingee (Western NSW), Carnarvon Gorge (south-central Queensland), Ubirr (Kakadu National Park) and Bulgandry (near Gosford, NSW). This is followed by practical advice on the removal of graffiti (and reducing its incidence), and the highlighting of engravings for public display. The last chapter deals with specialised techniques for the conservation of paintings (including the identification of pigments and the use of consolidants) and the reduction of weathering of engravings. One of the appendices deals with simple analytical techniques which will not be available to fieldworkers although knowledge of it and other more complex procedures dealt with by Lambert will help the site manager know when to involve a trained conservator.

The last appendix contains the Australian International Council on Monuments and Sites (ICOMOS) Charter ('The Burra Charter') which Lambert suggests serves as the guide for conservation action at any site. The volume contains a useful index. It was published in 1989 by the AIAS in its report series (Lambert 1989).

Physical protection of visited sites

Much of the support provided by the program has gone to State and Territory heritage protection agencies and to land managers to assist with the physical protection of petroglyph and pictograph sites which are the subject of visitation by tourists.

The Western Australian Museum has received funding from the Rock Art Protection Program for a project designed in consultation with the Ngarla and Coastal Njamal Aboriginal Corporation and which involved the members in the construction of fencing and other protective measures of an important site at Port Headland. The Northern Australian Museum of Arts and Science successfully sought funding on behalf of Aboriginal traditional owners for major fencing projects in the top end of the Northern Territory (Figure 5). The Conservation Commission of the Northern Territory received funds for projects designed to record sites in newly established national parks, and to establish, in consultation with the Aboriginal custodians in each area, which places might be visited and thus needed management with walkways and other visitor facilities. The South Australian Aboriginal Heritage Branch used funding from the program to build visitor control facilities at Akaroo in Wilpena Pound. The Queensland National Parks and Wildlife Service has developed protection projects at sites such as Nara Inlet on Hook Island, Kenniff Cave in the South-Central Highlands, and at Balancing Rock in Donna National Park near Chillagoe; the Quinkan Reserve Trust has received funding for site conservation measures designed to prevent visitor-induced dust from coating the painted rockface at the popular site of Split Rock near

Laura. The New South Wales National Parks and Wildlife Service obtained funds for several projects not only designed to provide physical protection of sites but also to enhance visitor appreciation of the rock pictures at them by using the results of research to develop informative signage and brochures (Figure 6). The Victoria Archaeological Survey used program funds to remove graffiti from sites in the Grampians National Park which also has been the focus of research into the effect of substrate salts upon painted walls: as well, the RAPP is funding research there which seeks to develop methods to remove salts deposited over paintings. The Tasmanian Department of Parks, Wildlife and Heritage used RAPP funds to implement the extensive protection measures necessary to preserve the famous Mount Cameron West engraving site.

The situation at Nara Inlet was unusual in that the site is relatively inaccessible by land but is well-known due to its location in the most popular recreational boat anchorage in the Whitsunday Islands. The project aimed to limit damage to the paintings there by controlling access to the site by placement of a boardwalk and, by providing informative signs, enhancing appreciation of the cultural context of those paintings. The Royal Australian Corps of Transport assisted with the difficult business of getting material to the shelter.

The same conditions in a shelter which provide for the preservation of paintings often contribute a permanently dry floor deposit; if the substrate is suitably fine-grained, there will be a fine dust layer at the foot of the painted surface and this is readily disturbed by animals and tourists. Moreover, dust might become bonded to the rock surface in the presence of airborne salts, and largely obscure the pictographs (Figure 3). A visitor boardwalk has been built at the Split Rock site near Laura on the Cape York Peninsula. Additionally, extensive mulching and suitable native plants were added to the immediate environs of the shelter to prevent fine dust from being disturbed from the dry floor deposit and settling on the painted surface (Figure 7). Comparison of recent photographs of the site with those made several years ago demonstrate the extent to which the imagery has been dulled by dust. The consultant engaged to oversee the protection works at Split Rock had been trained in rock art conservation at the Canberra College of Advanced Education (now the University of Canberra); he had sampled the dust layer for analysis and identification so as to advise upon the possibility of its removal. Not all airborne materials can be removed from painted surfaces without damaging the imagery.

The case for conservation at Split Rock was of particular importance; the site is well-known to travellers along the Cape York Peninsula Development Road and is seen by thousands of visitors each year. Some basic protective measures were in place but these were inadequate and did not deal with the problem of dust. The Laura area contains thousands of pictograph sites with extensive and spectacular imagery but Split Rock is the only one readily accessible from the road and perhaps the only example to be seen by most visiting the area. Its dust-affected and worsening condition presented an unfortunate example to the visitor giving a poor impression of some of the best pictographs in the world. Unfortunately this impression has been easily gained by less sympathetic visitors to Aboriginal Australia in general.

Silica skins: their potential for protection and dating

Researchers recording pictographs have noticed a clear or slightly milky film covering images or parts of images at many sites, especially those in the north of Australia. This film was identified as being composed of silica; it was observed to be deposited by ground water from siliceous rocks. It was considered to be detrimental to the imagery, particularly when it was thick enough to be opaque or became discoloured, and silicone drip-lines were installed to direct water flow away from paintings. However some argued that this phenomenon had the potential to preserve paintings by sealing them and thus protecting them from various sources of damage.

The program provided a grant to a geochemically - trained conservator, Alan Watchman, who conducted a series of studies while a Visiting Fellow at the Australian National University.

Watchman reported (1989, 1990) that silica skins:

- were formed by complex interactions among rainwater and groundwater, rock substrata, micro-organisms and climate;
- formed on different rock types in various climates; and
- were physically and chemically complex and might contain several minerals and organic materials in dynamic relationships.

Pigment applied to a rock face could be incorporated into the silica skin by microbiological activity and thus be strongly bonded to the underlying rock and preserved. He recommended that silica skins should be encouraged rather than prevented from forming on painted surfaces, as they assisted in maintaining the rock surface. Diversion of water from painted surfaces may adversely affect their natural preservation. The replication of naturally produced silica skins was not possible because of the complexity of the bio-geological processes involved at the rock surface. There was going to be no 'spray-can' solution to the problem of the preservation of rock paintings!

Watchman found that the micro-organisms encapsulated within the silica skins could provide organic matter which, when converted to carbon dioxide, could be used to date the formation of that layer by analysis of radiocarbon using Accelerator Mass Spectrometry (AMS). Moreover, the potential exists for dating silica skin layers by other cosmogenic methods, and study of some stable isotopes could help characterise the environment and climate at the time when paintings were sealed by the silica skins. Thus, the possibilities had been enhanced for understanding much more about the context of the painters and their paintings.

Related work conducted at the Australian National University and techniques developed in Arizona have provided further opportunities to view the prehistoric painters and engravers of Australia. From a series of studies at the Australian National University of ancient residues on stone tools came a successful attempt to identify the organic materials used to bind the ochres and other pigments used in pictographs. Human blood was used for this purpose in both the south-west of Tasmania and in the Daly River area of the Northern Territory. Extracts of blood protein were used to estimate, using AMS analysis of carbon these provided, the ten and twenty millennia dates for these respective pictograph sites (Loy **et al.** 1990).

Dating the organic component of an added pigment or a sealing siliceous film is all very well but what about the possibility of dating the negative impressions on rock which are engravings? A new technique called 'cation-ratio analysis', developed to date rock scree in the deserts of Arizona, have been applied to rock engravings in the Olary region of South Australia (Nobbs and Dorn 1988). Cation-ratio dating depends upon the micro-chemistry of rock varnish. a thin coating of minerals that develops upon rock surfaces particularly in arid regions. The ratio of potassium plus calcium ions to chemically stable titanium ions in the varnish has been shown to change over time. The correlation of this cation-ratio with AMS radiocarbon ages has allowed rock varnish to be used as a dating tool. Application of the technique in the Olary region has produced estimates of dates of between 1,400 and 31,700 years ago for a variety of motifs.

Apart from its own intrinsic interest, the application of such techniques is central to the conservation of rock pictures in that many studies of deterioration occurring at rock faces require such fundamental information in order to provide for complete understanding of those physical processes. The dating of sites was an essential part of this: were these engravings or paintings the results of the last few hundred years or were they several thousand years old? How long had there been for the interplay of forces which had led to the preservation or partial destruction of the pictures? The technological revolution during the 1980s in the dating of paintings and engravings had provided the methods to obtain a good idea of the scale of time involved, and this is fundamental to the development of sound strategies for the protection of sites. Moreover, it is

clear that the considerable antiquity of a place or a set of cultural attributes such as rock imagery increases the status of that place or attribute in the eyes of the public and that this appreciation is more likely to enhance the conservation of rock pictures.

ABORIGINAL STUDIES

This talk of high technology in the service of rock pictures should not take us too far from another fundamental reality of their preservation, the interest of the Aboriginal Peoples whose cultural ancestors were responsible for its production and continued preservation in the past and who continue today to produce and maintain rock images. Aboriginal communities wish to control access to and use of places containing rock pictures, especially where sites are of ritual significance. In many places this control has been formalised, as at Kakadu National Park (Figure 8). Two recent studies emphasise the importance of recognition of Aboriginal interests.

Maintenance of culture, and the national heritage

It is well documented that diverse motifs in various parts of Australia have been repainted many times. A Western Australia study reported sixteen layers of paint at one site; Watchman found layers of pigment separated by layers of silica. Repainting was done to maintain the cultural integrity of sites. At the AURA Congress in Darwin in September 1988, David Mowaljarlai, a traditional man from the Mowanjum Community of Derby in Western Australia, presented a paper which stressed the importance and significance of a range of sites in terms of Aboriginal cosmology, and his community members' strongly felt commitment to the land from which they came and which sustains them. This statement subsequently was published in the British journal **Antiquity** (Mowaljarlai **et al.** 1989; also Mowaljarlai and Peck 1988). Mowaljarlai went on to outline the course of a project to repaint sites in the Kimberley area as part of a plan to revive and maintain traditional values even in the context of a rapidly changing social environment. The project had been opposed by non-Aboriginal landholders and persons concerned to protect the integrity of 'rock art' as 'national heritage'. A study conducted by the Department of Aboriginal Sites of the Western Australian Museum which has statutory responsibility under the Western Australian **Aboriginal Heritage Act 1972-1980** for such sites, concluded that there was little substance to the complaints being made and that no action was warranted under the Act. Similar opposing positions were taken in discussions at the conference.

Such incidents highlight the fact that sites with rock imagery can have multiple values and that those values may be very different to different community groups. This poses problems for cultural heritage managers and conservators who then are faced with the problem of which conservation alternative to emphasise. Some guidance is provided by the Burra Charter which stresses that the significance or value of a site dictates conservation practice. In the case of the Kimberley repainting, the Western Australian Museum assessment determined that the primary significance of the sites resided in their importance to the Aboriginal community as part of a long tradition.

There is an interesting conflict between two sorts of preservation here. The national heritage argument sees the value of the paintings being destroyed or at least significantly lessened as 'art' as a result of their repainting; that the paintings would continue to fade or otherwise deteriorate over time does not seem to be a major concern. The Aboriginal heritage argument stresses the value of the place - only incidentally the paintings - in terms of the process of maintaining cultural links with the country; that the 'presence' of the paintings and their longevity is enhanced at the same time appears only incidental.

Managing the dreaming

The second example of Aboriginal interest in the protection of rock imagery is also a final example of a project funded by the RAPP, one which has implications for a program of action to

preserve Australian rock paintings and engravings. A project carried out by Darell Lewis and Deborah Rose in the Victoria River area of the Northern Territory considered in detail the significance to the local community of sites which they had recorded there.

They distinguished two main categories of imagery, the first identified by Aboriginal people as originating with them is concerned mainly with sorcery, while the second comprises images not recognised as being made by humans to represent Dreaming Beings but rather, it is said, such images are made by Dreaming Beings and are Dreaming Beings; they are the "... shape of the Dreaming, the living presence, in past, present and future time of the origins of the cosmos" (Lewis and Rose 1988:50); the cultural meaning of the paintings depends upon a knowledge which is beyond the depictions themselves. The researchers set these ideas in the context of the Aboriginal concept of 'country', the relationships between people and country, and those among people themselves, all of which relate to the processes of maintaining Aboriginal cultural integrity. This is especially so in relation to non-Aborigines and the non-Aboriginal pressures impacting upon the country and its people, one aspect of which is the protection from outsiders of access to sacred knowledge.

All of this is related directly by the researchers to the preservation of the paintings. Referring to the emphasis in the Burra Charter on conservation as "... all the processes of looking after a **place** so as to retain its **cultural significance**" (1979/1988:1.4) the researchers argue that physical intervention by non-Aborigines could seriously undermine the Aboriginal cultural significance of a place. Their solution - derived from discussions with the Aboriginal community - emphasises the concerns of the traditional custodians recognising their community status and traditional responsibility. Lewis and Rose detail a series of steps designed to give local Aboriginal communities direct and practical responsibility for the protection and maintenance of their own sites; certainly they recommend (1988:70) that "... no physical intervention ... be undertaken with respect to 'art' in the area except at the express and voluntary request of the Aboriginal custodians".

Such is the practice today of responsible conservators and site managers; the RAPP requires Aboriginal interests to be assessed and used as a guide in the drawing up of the proposal for conservation funding and the implementation of protective works. The results have been manifest in a variety of ways, from emphasis upon priority being given to surveys of sites and assessment of their cultural significance in areas of Aboriginal concern with actual or proposed land use, to the improvement of signage with relevant cultural text at visitation sites. The continued demand for funding for a variety of such projects indicates that the interest in and concern for the preservation of rock pictures in Australia is growing as the imagery becomes better known and is increasingly the focus of visitation both by Australians and overseas tourists. The challenge is to ensure that protective measures are relevant to the interests of all the community.

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